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HENRY S. GRAVES, Forester.

NATIONAL FOREST FIRE-PROTECTION PLANS.

By COERT DUBOIS, *Associate District Forester, District 5.*

The forester has use for all the enterprise, originality, and energy that characterizes the American business man. His problems can be solved only through intimate knowledge of our forests and of our conditions. This is as true of the forest-fire problem as of any other. Perhaps India approaches our conditions more closely than any other country, with its remote districts, long dry season, and large areas of virgin forest, and its forest history might be studied to advantage. But, as the American logger had to work out for himself the organizations and the equipment to handle American timber, so the American forester must work out, with the money, men, and equipment at his command, an effective protection scheme for the National Forests for which he is responsible.

There is such a close similarity betwcen the task of controlling a forest fire and in checking the advance of a hostile force that military methods can be studied and, in many cases, applied in a more or less modified form. Army methods of communication, signaling, supplying men on the fighting line, or moving bodies of men, worked out to a high degree of efficiency during a long series of years, may be applied in many instances to fire-fighting conditions in the National Forests.

The Army officers' war game has a parallel in the "forest-fire game" recently introduced at certain California ranger meetings. For this game a large scale detailed map of the forest is hung up in front of the assembled rangers, with a movable paper arrow on it to show wind direction. A visiting officer, or one unfamiliar with the country, then sticks either a black or white tack in the map to represent a fire occurring in the night or in the day time. The ranger in whose district it is is called upon and made to answer immediately a line of rapid-fire questions, such as: Where is it? Where is it going? How could he hear of it? How would he get to it? How many men would he get? Where would he get them? How would he get them to the fire? Where would he get food, tools? Where would he establish camp? Where would he start work? Suppose it got clear away, where and how would he get reenforcements? What protective measures could have been taken in advance that

would have made this fire easier to handle? The Forest Service can take one very large leaf out of the Army's book—the title of which is "Preparation."

The National Forest force, like the standing Army in this country, can never be much more than a nucleus around which a volunteer fighting force is organized. It will always direct the fighting, furnish pay, tools, subsistence, and transportation. But the Service has never gone much further than issuing a hurry call for volunteers after trouble has already broken out. It has not organized its militia, it has done little toward training its volunteer help in advance of actual service, and even its means of summoning them are slow and inadequate. With a limited amount of money the National Forests must be kept comparatively free from fires or the whole fabric of forestry upon them fails.

The first requisite in preparing a fire plan is an intimate knowledge of the forest. For the purposes of protective organization, the ranger district must be the unit of study. Individual ranger district plans, coordinated, of course, with those of adjacent districts, are essential, first, because of the wide variation in the factors which go to make up the fire danger and, second, because the responsibility for carrying out the plan must center upon the field man in charge of the area it covers. The supervisor will supervise a forest-protection plan, but the rangers execute it, each for his own district.

A study of a ranger district, which should be made in the field with the ranger, will generally show two classes of danger zones, which may or may not be coincident. It will show areas where there is great danger of fires starting, such as the vicinity of a logging operation, along a railroad, in a community of malcontents, near frequented camping grounds. It will show other areas where much damage will be done if fire gets in, such as a logging slash, a windfall, thickets of young growth, reproducing timber-sale areas, experimental plots or improvements. When all areas of both classes have been located, studied, described, and mapped, then protective measures for each must be devised. A great help at the beginning of such a study is to map roughly on a proclamation diagram all fires that have occurred the past four of five years, using a distinct color for each year. Where these are concentrated year after year it is certain that there is a danger area that requires special study.

The first class of dangers described needs preventive measures; the latter class needs protective measures. After the inventory of dangers is complete the inventory of resources to combat them must be taken. Preventive measures against campers' fires, for instance, may consist in establishing a campers' register at a ranger station on the main traveled route to the camping grounds. It has been found in California that the names and plans of the campers are

easily secured if only the ranger has something to give in exchange. Campers' maps have therefore been prepared showing roads, trails, meadows where feed may be obtained, and other data of interest to the camper. Rules for care with fires and a short summary of the game and fire laws are printed on the margin of the map. The fact that his name, address, and destination are on record with the ranger is no slight restraint to prevent a camper from being careless with his fires. Other preventive measures are readily suggested, such as the detail of guards on inquiry work in communities known to have started incendiary fires, inducing loggers or others operating engines to adopt improved spark arresters, or the use of railroad speeders to follow trains through the forest.

Protective measures may consist of burned or cleared fire lines around a slash, a timber sale, or an experimental plot; or they may take the form of cleaning up a camping ground, or of some advance preparation for quick back-firing along a strategic ridge where inflammable material is scarce, or of provision for quicker discovery and swifter action when fire breaks out.

With the plan developed this far it is then necessary to marshal the protective forces in the most effective way possible. With the volume of administrative work going on upon a forest, the changing demands upon his men and money, and the uncertainty of the amount of his next year's funds, the supervisor finds it difficult to plan a concrete defensive campaign very far ahead. To meet this difficulty an ideal plan is outlined, one that will guarantee practically complete protection against fire loss. With an ideal system of defense worked out, with a view to future as well as present conditions, it is a much simpler matter to apply with a high degree of effectiveness the men and money available for any given fire season. This entails, of course, a secondary plan at the beginning of each season, but with the ideal plan at hand it is easy to say that, in view of these fixed dangers, this telephone or that trail must be built at once, and this lookout station or that tool cache can wait another year. It is easy, too, to say that this division must have the two patrolmen called for in the ideal plan, but those two divisions can, in the present state of our appropriations, be covered by one patrolman. The ideal fire plan precludes haphazard location of permanent improvements or assignments of men.

The ranger district is divided into patrol divisions that form natural fire-protective units. As nearly as possible, they should be of a size that one man can cover effectively. This is, of course, an ideal that can at present be only approximately realized. The topography and accessibility of the division, whether or not it can be covered from a lookout station, are factors that weigh with area in fixing division boundaries. Without such definitely fixed subdi-

visions, there is always danger of overlapping patrol, divided authority, and misunderstanding of responsibility. The patrolman's headquarters within each division must be located with reference to the best patrol routes, and these latter must be fixed in advance.

The importance of communication between the lookouts, the patrolmen, and the district ranger can not be too strongly emphasized. A patrolman out of communication who does not happen to see a fire just as soon as it starts loses most of his effectiveness. He then becomes simply a fire fighter whose only advantage over any other fire fighter is his training. It is fire preventers we must have. On one division on a California forest the patrolman's headquarters camp is equipped with a telephone connected with the district ranger's headquarters and with a lookout station commanding the division. He has two fixed routes, one up the country and one down. At the end of each route he can report in by other phones. Each morning he reports both to the lookout and to the district ranger which route he is going to take. This leaves him out of communication only a very few hours each day and both the lookout and the district ranger know where he is all the time. In another division that is heavily timbered and has no commanding points it is planned to have the division patrolman remain in camp or within reach of a phone all the time, since the whole division is easily seen from a lookout station in an adjoining division which is connected by phone with the district ranger. In order to coordinate work and have a clearing house of information, no lookout should instruct the patrolman direct if the communication system is sufficiently complete to permit notification of the fire to come through the district ranger's headquarters. If many patrolmen are riding one district it may be necessary to keep a wall map in the district ranger's headquarters in which pins are stuck to represent the men, changing their location as the patrolmen report in. When a lookout reports a fire the district ranger then sees at a glance just where every man in his district is.

Drawing up the division plans automatically locates the improvements essential to their proper working. Thus, if it is decided that such and such meadow is logically the patrol headquarters for a certain division, it follows that arrangements must be made to house the man, furnish him tools, feed or pasture his horses, and put him in communication with the nearest lookout and the district ranger.

The determination of the divisions, the assignment of patrol routes and patrol headquarters, the completion of the means of communication, and the selection and equipment of lookout stations may be said to comprise the control system. When this is complete, the next step is to perfect arrangements for fighting the fires that occur.

Of course every patrolman becomes a fire fighter immediately on the outbreak of any fire in his vicinity. The patrolmen, together with

any permanent fire crew, improvement crew, reconnaissance crew, or United States troops that may be stationed in the district make up the "regular" force of fire fighters. This district ranger should figure out in advance the number of regulars he must assemble at a given point in sufficiently quick time to check a fire in its incipiency. If every patrolman or other regular, immediately and without orders, quit his division and hurried to every fire he saw or heard of, the result might be a surplus of men on a fire already held under control by the division regulars and volunteers. On the outbreak of a fire, the regulars in a division where it occurs should proceed to it immediately, and all other division patrolmen who see it or hear of it should proceed as rapidly as possible to the nearest point of communication with the district ranger, report to him and wait for orders. Disastrous results may follow the concentration of all regulars at one point in the district and the consequent abandonment of outlying divisions.

But just as the standing Army could not cope unaided with a foreign invasion, so the force of regulars on any National Forest can not handle the fire situation without volunteer help from citizens living in or near it. The district ranger must study out this resource just as the War Department keeps tab on the strength and equipment of militia organizations throughout the country. Each settler or stockman who is a resident in the district during the fire season should be spotted on the map accompanying the district fire plan. The number that can be assembled at a given point in a given time should be worked out, and it should also be determined in advance just what fire-fighting equipment each one habitually keeps at his camp. If, for instance, a fire occurs near a certain cow camp where the district ranger knows the owner keeps on hand a supply of tools and food sufficient to maintain a crew of 10 fire fighters on the line for 3 days, and if he knows also that he can secure 3 pack horses at this cow camp, he can rush a fire crew into this locality, establish a base camp at the cowman's camp, and save possibly 2 days that might be necessary to transport tools and supplies into this country. It goes without saying that the cowman will be immediately reimbursed.

Before the fire season opens a definite understanding should be reached between the supervisor or the district ranger and all sawmill operators or construction superintendents within the district as to just the circumstances under which their crews will be called upon to fight fire, how far they will go from their work, and the compensation the men will receive. Misunderstanding and friction have occurred because such points were not settled in advance. The terms of pay, transportation, and subsistence should also be understood in advance by all possible volunteers.

Just as important as an advance inventory of all available volunteer fire fighters is an advance inventory of all possible means of transportation and bases of supplies. Lists should be made showing the location of all horses, pack outfits, and wagons in the district that it is possible to hire at need. The ranger should also list the country stores from which supplies and tools may be obtained, and satisfy himself that their stock is adequate. If it is not, he may be able to induce the proprietor to increase it.

A study of this sort may show the necessity of establishing Service caches of nonperishable food supplies and fire-fighting equipment.

When a district plan has proceeded this far toward completion it is an easy matter to look back over it and determine closely what it will cost to put it into effect. This must include the number of men, time on duty, the rate per month, the cost of any fire-line crews or permanent fire crews, the cost of improvements, and of supplies and tools. For purposes of comparison with other districts, the cost per acre should be worked out. In order to assess properly the cost of protection, yearlong rangers engaged primarily in administrative work should not be charged against protection. In fact, far more efficient protection will be secured by relieving just as far as possible the protective men from the administrative work, and, vice versa, the strictly administrative men from patrol work. The district ranger must, of course, supervise both lines in his district.

In some of our National Forests a large proportion of the land is privately owned. In such cases it may be necessary not to put the plan into effect unless the cooperation of the landowners can be secured. But there are many reasons why the ideal protection should be made to cover all land inside a district regardless of ownership. In the first place, it is much easier to induce a landowner to spend money for fire protection in cooperation with the Forest Service if he knows exactly what it is going to be spent for. If he examines a copy of the plan for the district in which his land lies and agrees with the methods proposed he is more likely to contribute his pro rata share of its cost than if called upon for an amount for an indefinite purpose. Again, cooperative protection for a large area under a comprehensive plan is cheaper and more effective than protection by individuals of scattered tracts of forest land. Even if all the owners will not cooperate, the Government as a conserver of natural resources must, to a certain extent, protect private timberland in connection with its own, and indeed, where the percentage of private land is low, the Government must protect it in order to insure its own timber.

The following scheme for handling cooperative funds has been worked out in District 5, for use where the private holdings are exceptionally heavy. Since permanent improvements are needed for administrative as well as for protective work, and since they should

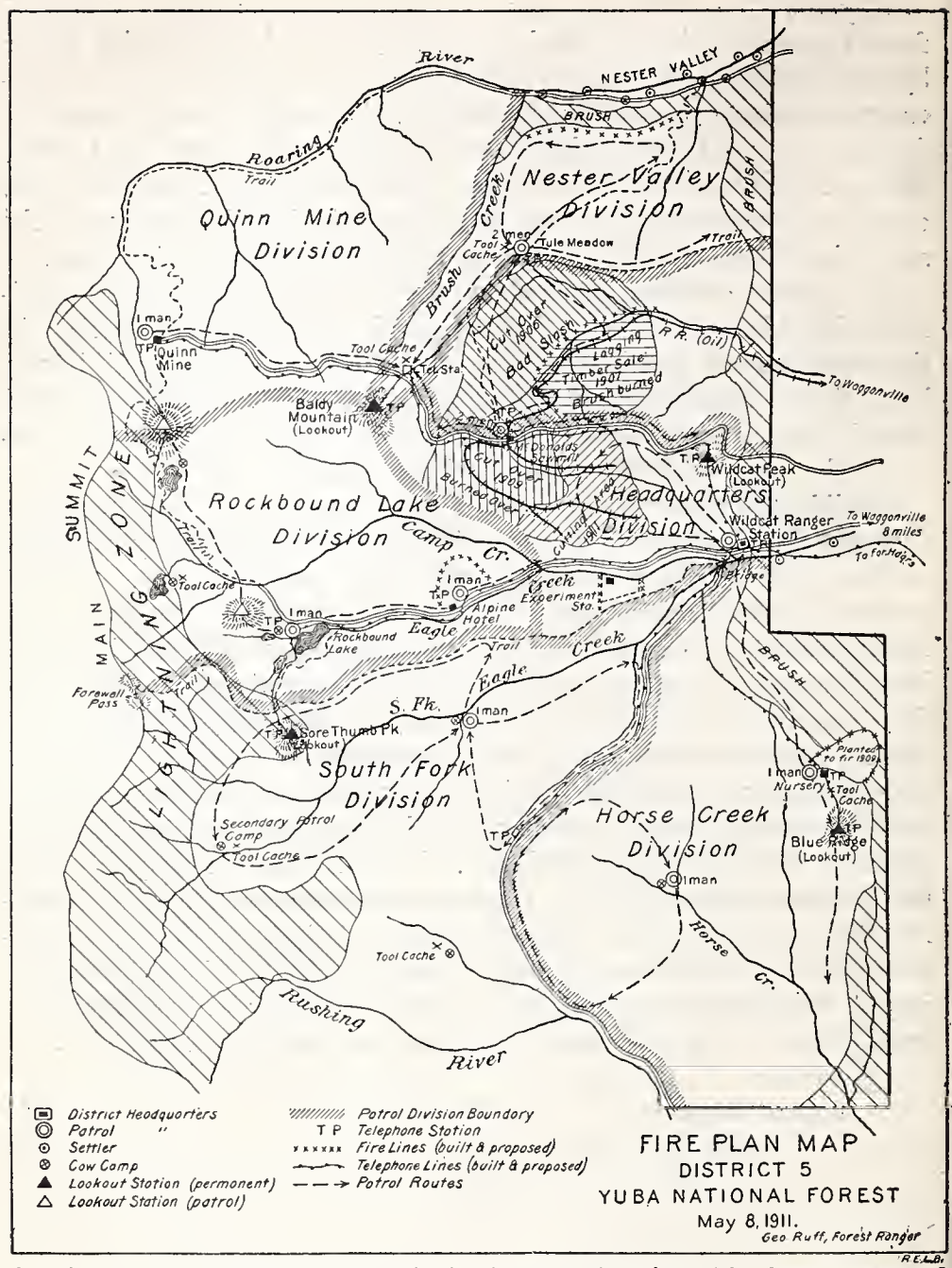
in any event be owned by the Government, their cost is deducted from the cost of the plan and the cost per acre for protection found by dividing the remainder by the acreage of the district. The owners who have approved the protection plan and agree to cooperate deposit in a local bank, subject to cashier's check, a sum equal to the cost per acre times their acreage. The owners agree to leave the entire supervision of the work, including picking the men, with the supervisor, who, on his part, agrees to follow the protection plan.

The supervisor then issues time checks to the patrolmen, or certifies to bills for tools or supplies, designating on the time check or bill the account from which it is to be paid. These the bank will honor, by cashier's check, against the specified account. This, of course, would require a series of three-cornered cooperative agreements between the supervisor, the owner, and the bank.

Possibly the most valuable result of the study for a fire plan of a forest is the clearness with which it shows how the money available for its administration can be used to the best advantage. If the supervisor were to maintain a large yearlong ranger force and spend much of his permanent improvement fund on ranger stations and horse pastures, he could not carry out a protection plan that calls for a small administrative force, a large number of short-term men during the fire season, and a wide extension of the trail, telephone, and fire-break system. Preparing such plans will do more than any other one thing toward insuring that the maximum of results will be obtained from a given expenditure. It will make the ranger, who is the backbone of the Service, realize as nothing else will the seriousness of the fire question, and how much must be done to plan beforehand for every contingency that is likely to arise. Forest-fire fighting on the spur of the moment is about as likely to be effective as would be the efforts of volunteer bucket brigades in a large city.

Approved:

JAMES WILSON,
Secretary of Agriculture.



Sample map to accompany a ranger-district fire-protection plan. The danger areas and the organization of the control system are shown.